

Appl. No. 10/721,876
Examiner: Lum, Leon, Art Unit 1641
In response to the Office Action dated December 20, 2005

Date: April 20, 2006
Attorney Docket No. 10116401

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Withdrawn): A manufacturing process of a nano device transistor for a biosensor, the manufacturing process being used for forming a structure of an off-set nano device transistor, the manufacturing process comprising the following steps:

depositing a bottom gate on a silicon substrate having SiO₂ deposited on it;

depositing a gate dielectric layer to be an interface layer for insulating the bottom gate;

coating a nano channel layer;

depositing a drain and a source on the boundary of the nano channel layer and the gate oxidization layer;

depositing a protection layer and performing coating, lithography and etching to form a first protection layer and a second protection layer, the first protection layer and the second protection layer being used for separately covering and insulating the drain and the source so as to define an off-set area on the boundary of the first and second protection layers and the nano channel layer; and

performing the lithography wet etching for defining a detection area;

wherein the detection area is used for detecting an object so as to achieve the object of detecting the specific bio species for bio measurement.

Claim 2 (Withdrawn): The manufacturing process of claim 1, wherein the bottom gate is made of the material of metal or poly-silicon.

Claim 3 (Withdrawn): The manufacturing process of claim 1, wherein a surfactant and the anti-body for the object to be detected are absorbed on the refurbished nano channel layer.

Claim 4 (Withdrawn): The manufacturing process of claim 1, wherein the drain and the source are metal electrodes.

Claim 5 (Withdrawn): The manufacturing process of claim 1, wherein the first protection

Appl. No. 10/721,876

Examiner: Lum, Leon, Art Unit 1641

In response to the Office Action dated December 20, 2005

Date: April 20, 2006

Attorney Docket No. 10116401

layer and the second protection layer are made of the material of SiO_x , SiN_x or other insulation materials.

Claim 6 (Withdrawn): The manufacturing process of claim 1, wherein the gate dielectric layer is made of the material of SiO_x , SiN_x or other gate dielectric materials.

Claim 7 (Withdrawn): A manufacturing process of a nano device transistor for a biosensor, the manufacturing process being used for forming a structure of a double gate nano device transistor, the manufacturing process comprising the following steps:

- depositing a bottom gate on a silicon substrate having SiO_2 deposited on it;

- depositing a gate dielectric layer to be an interface layer for insulating the bottom gate;

- coating a nano channel layer;

- depositing a drain and a source on the boundary of the nano channel layer and the gate oxidization layer;

- depositing a ceiling gate dielectric layer for insulating the drain and the source from the nano channel layer;

- depositing a ceiling gate above the ceiling gate dielectric layer, and performing a lithography etching method to define the shape of the ceiling gate; and

- depositing a protection layer and then performing the lithography etching method to make the ceiling gate dielectric layer etched downward so as to form a first ceiling gate dielectric layer and a second ceiling gate dielectric layer, and the two-sides separated ceiling gate dielectric layer being covered with a first protection layer and a second protection layer so as to define and form a detection area;

wherein the detection area is used for detecting an object so as to achieve the object of detecting the specific bio species for bio measurement.

Claim 8 (Withdrawn): The manufacturing process of claim 7, wherein the bottom gate is made of the material of metal or poly-silicon.

Claim 9 (Withdrawn): The manufacturing process of claim 7, wherein a surfactant and the anti-body for the object to be detected are absorbed on the refurbished nano channel layer.

Appl. No. 10/721,876

Examiner: Lum, Leon, Art Unit 1641

In response to the Office Action dated December 20, 2005

Date: April 20, 2006

Attorney Docket No. 10116401

Claim 10 (Withdrawn): The manufacturing process of claim 7, wherein the drain and the source are metal electrodes.

Claim 11 (Withdrawn): The manufacturing process of claim 7, wherein the first protection layer and the second protection layer are made of the material of SiO_x , SiN_x or other insulation materials.

Claim 12 (Withdrawn): The manufacturing process of claim 7, wherein the gate dielectric layer is made of the material of SiO_x , SiN_x or other gate dielectric materials.

Claim 13 (Withdrawn): The manufacturing process of claim 7, wherein the ceiling gate is made of the material of metal.

Claim 14 (Withdrawn): The manufacturing process of claim 7, wherein the first ceiling gate dielectric layer and the second ceiling gate dielectric layer are made of the material of SiO_x , SiN_x or other gate dielectric materials.

Claim 15 (Withdrawn): The manufacturing process of claim 7, wherein the position of the ceiling gate is any position on the ceiling gate dielectric layer, and the ceiling gate covers a portion of the nano channel layer.

Claim 16 (Withdrawn): A structure of a nano device transistor for a biosensor, a detection area of an off-set nano device transistor being used for detecting an object so as to detect the specific bio species, the structure comprising:

- a silicon substrate having SiO_2 deposited on it;
- a bottom gate positioned on the silicon substrate having SiO_2 deposited on it;
- a gate dielectric layer being an interface layer for insulating the bottom gate;
- a nano channel layer positioned on the gate dielectric layer;
- a drain positioned on the boundary of the nano channel layer and the gate dielectric layer;
- a source positioned on the boundary of the nano channel layer and the gate dielectric layer;
- a first protection layer for covering and insulating the drain; and

Appl. No. 10/721,876

Examiner: Lum, Leon, Art Unit 1641

In response to the Office Action dated December 20, 2005

Date: April 20, 2006

Attorney Docket No. 10116401

a second protection layer for covering and insulating the source;
wherein by means of the first protection layer, the second protection layer and the nano channel layer, a detection area is defined, and then used for detecting an object to be detected so as to achieve the object of detecting the specific bio species for bio measurement.

Claim 17 (Withdrawn): The structure of claim 16, wherein the bottom gate is made of the material of metal or poly-silicon.

Claim 18 (Withdrawn): The structure of claim 16, wherein a surfactant and the anti-body for the object to be detected are absorbed on the refurbished nano channel layer.

Claim 19 (Withdrawn): The structure of claim 16, wherein the drain and the source are metal electrodes.

Claim 20 (Withdrawn): The structure of claim 16, wherein the first protection layer and the second protection layer are made of the material of SiO_x , SiN_x or other insulation materials.

Claim 21 (Withdrawn): The structure of claim 16, wherein the gate dielectric layer is made of the material of SiO_x , SiN_x or other gate dielectric materials.

Claim 22 (Withdrawn): The structure of claim 16, wherein the first protection layer, the second protection layer and the nano channel layer are used for defining a detection area.

Claim 23 (Withdrawn): The structure of claim 16, wherein a plurality of off-set nano device transistors are connected to form a serial connection structure of the off-set nano device transistors.

Claim 24 (Withdrawn): The structure of claim 16, wherein a plurality of nano channel layers are connected between the drain and the source in the structure of the off-set nano device transistor, or a plurality of off-set nano device transistors are connected so as to form a parallel connection structure of the off-set nano device transistor.

Appl. No. 10/721,876

Examiner: Lum, Leon, Art Unit 1641

In response to the Office Action dated December 20, 2005

Date: April 20, 2006

Attorney Docket No. 10116401

Claim 25 (Currently amended): A structure of a nano device transistor for a biosensor, ~~a detection area of a double gate nano device transistor being used for detecting an object so as to detect the specific bio species, the structure comprising:~~

a silicon substrate having SiO₂ deposited ~~on it thereon~~;

a bottom gate positioned on the silicon substrate having SiO₂ deposited ~~on it thereon~~;

a gate dielectric layer positioned on the bottom gate being an interface layer for insulating the bottom gate;

a nano channel layer positioned on the gate dielectric layer;

a drain positioned ~~on the~~ extending over a first portion of a top surface ~~boundary~~ of the nano channel layer and a first portion of a top surface the gate dielectric layer;

a source positioned ~~on the~~ extending over a second portion of the top surface ~~boundary~~ of the nano channel layer and a second portion of the top surface the gate dielectric layer;

a ceiling gate dielectric layer ~~positioned on the drain and the source~~, comprising a first ceiling gate dielectric layer portion and a second ceiling gate dielectric layer portion positioned on the drain and the source, respectively;

a ceiling gate positioned on the ceiling gate dielectric layer;

a first protection layer positioned on ~~the surface of~~ the first ceiling gate dielectric layer portion; and

a second protection layer positioned on ~~the surface of~~ the second ceiling gate dielectric layer portion;

~~wherein the first protection layer, the second protection layer, and the first ceiling gate dielectric layer, the second ceiling gate dielectric layer and the nano channel layer are used to define a detection area for detecting an object so as to achieve the object of detecting the specific bio species for bio measurement.~~

Claim 26 (Currently amended): The structure of claim 25, wherein the bottom gate is ~~made of the material of~~ comprises metal or poly-silicon.

Claim 27 (Currently amended): The structure of claim 25, wherein a surfactant and ~~the a~~ target anti-body ~~for the object to be detected~~ are absorbed absorbable on the ~~refurbished~~ nano channel layer.

Appl. No. 10/721,876

Examiner: Lum, Leon, Art Unit 1641

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Date: April 20, 2006
Attorney Docket No. 10116401

Claim 28 (Original): The structure of claim 25, wherein the drain and the source are metal electrodes.

Claim 29 (Currently amended): The structure of claim 25, wherein the first protection layer and the second protection layer comprise ~~are made of the material of SiO_x, SiN_x, silicon oxide, silicon nitride~~ or other insulation materials.

Claim 30 (Currently amended): The structure of claim 25, wherein the gate dielectric layer comprises ~~is made of the material of SiO_x, SiN_x, silicon oxide, silicon nitride~~ or other gate dielectric materials.

Claim 31 (Currently amended): The structure of claim 25, wherein the ceiling gate ~~is made of the material of~~ comprises metal.

Claim 32 (Currently amended): The structure of claim 25, wherein the first ceiling gate dielectric layer portion and the second ceiling gate dielectric layer portion comprise ~~are made of the material of SiO_x, SiN_x, silicon oxide, silicon nitride~~ or other insulation materials.

Claim 33 (Currently amended): The structure of claim 25, wherein ~~the position of the ceiling gate is any position on the ceiling gate dielectric layer, and~~ the ceiling gate covers a portion of the nano channel layer.

Claim 34 (Currently amended): The structure of claim 25, wherein a plurality of ~~double-gate~~ the nano device transistors are connected to form a serial connection structure of the ~~double-gate~~ nano device transistors.

Claim 35 (Currently amended): The structure of claim 25, wherein a plurality of the nano channel layers are connected between the drain and the source in ~~the structure of the double-gate~~ nano device transistor, or a plurality of ~~double-gate~~ the nano device transistors are connected ~~so as to~~ form a parallel connection structure for the ~~double-gate~~ nano device transistor